

CLAIMS

I claim:

- 1 1). A method, comprising:
 - 2 performing parameterization on three-dimensional graphics model geometric
 - 3 data;
 - 4 performing scalar quantization on the three-dimensional graphics model
 - 5 geometric data;
 - 6 encoding the three-dimensional graphics model geometric data differentially;
 - 7 and
 - 8 generating coded and compressed three-dimensional graphics model
 - 9 geometric data.
- 1 2). The method of claim 1, wherein the three-dimensional graphics model
- 2 geometric data includes normalized normal vectors.
- 1 3). The method of claim 2, wherein performing parameterization further
- 2 comprises mapping the normalized normal vectors into actual spherical
- 3 coordinate values.
- 1 4). The method of claim 3, wherein performing scalar quantization further
- 2 comprises generating actual quantized spherical coordinate values.
- 1 5). The method of claim 4, wherein encoding the three-dimensional graphics
- 2 model geometric data differentially further comprises:
 - 3 generating predicted quantized spherical coordinate values from at least one
 - 4 actual previously quantized spherical coordinate value; and
 - 5 generating error values by subtracting the predicted quantized spherical
 - 6 coordinate values from the actual quantized spherical coordinate values.

1 6). The method of claim 5, further comprising encoding the error values using
2 entropy encoding.

1 7). The method of claim 6, wherein the coded and compressed data is Motion
2 Pictures Experts Group 4, 3 Dimension Model Coded (MPEG4 3DMC).

1 8). A system, comprising:
2 means for performing parameterization on three-dimensional graphics model
3 geometric data;
4 means for performing scalar quantization on the three-dimensional graphics
5 model geometric data;
6 means for encoding the three-dimensional graphics model geometric data
7 differentially; and
8 means for generating coded and compressed three-dimensional graphics
9 model geometric data.

1 9). The system of claim 8, wherein the three-dimensional graphics model
2 geometric data includes normalized normal vectors.

1 10). The system of claim 9, wherein the means for performing
2 parameterization further comprises means for mapping the normalized
3 normal vectors into actual spherical coordinate values.

1 11). The system of claim 9, wherein performing scalar quantization further
2 comprises generating actual quantized spherical coordinate values.

1 12). The system of claim 11, wherein the means for encoding the three-
2 dimensional graphics model geometric data differentially further comprises:

3 means for generating predicted quantized spherical coordinate values from at
4 least one actual previously quantized spherical coordinate value; and
5 means for generating error values by subtracting the predicted quantized
6 spherical coordinate values from the actual quantized spherical coordinate
7 values.

1 13). The system of claim 12, further comprising means for encoding the error
2 values using entropy encoding.

1 14). The system of claim 13, wherein the coded and compressed data is
2 Motion Pictures Experts Group 4, 3 Dimension Model Coded (MPEG4
3 3DMC).

1 15). A computer-readable medium having stored thereon a plurality of
2 instructions, said plurality of instructions when executed by a computer,
3 cause said computer to perform:
4 performing parameterization on three-dimensional graphics model geometric
5 data;
6 performing scalar quantization on the three-dimensional graphics model
7 geometric data;
8 encoding the three-dimensional graphics model geometric data differentially;
9 and
10 generating coded and compressed three-dimensional graphics model
11 geometric data.

1 16). The computer-readable medium of claim 15 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer, cause said computer to further perform normalizing normal vectors
4 from the three-dimensional graphics model geometric data.

1 17). The computer-readable medium of claim 16 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer for performing parameterization, cause said computer to further
4 perform mapping the normalized normal vectors into actual spherical
5 coordinate values.

1 18). The computer-readable medium of claim 16 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer for performing quantization, cause said computer to further perform
4 generating actual quantized spherical coordinate values

1 19). The computer-readable medium of claim 18 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer for encoding the three-dimensional graphics model geometric data
4 differentially, cause said computer to further perform:
5 generating predicted quantized spherical coordinate values from at least one
6 actual previously quantized spherical coordinate value; and
7 generating error values by subtracting the predicted quantized spherical
8 coordinate values from the actual quantized spherical coordinate values.

1 20). The computer-readable medium of claim 19 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer, cause said computer to further perform encoding the error values
4 using entropy encoding.

1 21). The computer-readable medium of claim 20, wherein the coded and
2 compressed data is Motion Pictures Experts Group 4, 3 Dimension Model
3 Coded (MPEG4 3DMC).

1 22). A system, comprising:
2 a parameterized normal encoder comprising,
3 a processor, wherein the processor performs scalar quantization and
4 parameterization on three-dimensional graphics model geometric data;
5 and
6 a storage device connected to the processor for storing instructions
7 executed by the processor;
8 a predictor connected to the parameterized normal encoder; and
9 an entropy encoder connected to the predictor; wherein the system
10 generates coded and compressed three-dimensional graphics model
11 geometric data.

1 23). The system of claim 22, wherein the three-dimensional graphics model
2 geometric data includes normalized normal vectors.

1 24). The system of claim 23, wherein the processor maps the normalized
2 normal vectors into actual spherical coordinate values and quantizes the
3 actual spherical coordinate values into actual quantized spherical coordinate
4 values.

1 25). The system of claim 24, wherein the predictor generates predicted
2 quantized spherical coordinate values from at least one actual previously
3 quantized spherical coordinate value.

1 26). The system of claim 25, wherein the processor generates error values by
2 subtracting the predicted quantized spherical coordinate values from the
3 actual previously quantized spherical coordinate values.

1 27). The system of claim 25, wherein the entropy encoder encodes the error
2 values using entropy encoding.

1 28). The system of claim 27, wherein the coded and compressed data is
2 Motion Pictures Experts Group 4, 3 Dimension Model Coded (MPEG4
3 3DMC).

1 29). A method, comprising:
2 generating actual quantized spherical coordinate values by adding error
3 values to predicted quantized spherical coordinate values;
4 performing deparameterization and scalar dequantization on the actual
5 quantized spherical coordinate values; and
6 generating decompressed three-dimensional graphics model geometric data
7 from the dequantized spherical coordinate values.

1 30). The method of claim 29, wherein performing deparameterization and
2 scalar dequantization further comprises mapping spherical coordinate values
3 into decoded, dequantized, unnormalized normal vectors.

1 31). The method of claim 30, further comprising decoding compressed three-
2 dimensional graphics model geometric data using entropy decoding, wherein
3 the compressed three-dimensional graphics model geometric data contains
4 error values.

1 32). The method of claim 31, wherein generating actual quantized spherical
2 coordinate values further comprises:
3 adding error values to the predicted quantized spherical coordinate values to
4 generate the actual quantized spherical coordinate values.

1 33). The method of claim 32, wherein the compressed three-dimensional
2 graphics model geometric data is MPEG4 3DMC.

1 34). A system, comprising:
2 means for generating actual quantized spherical coordinate values by adding
3 error values to predicted quantized spherical coordinate values;
4 means for performing deparameterization and scalar dequantization on the
5 actual quantized spherical coordinate values; and
6 means for generating decompressed three-dimensional graphics model
7 geometric data from the dequantized spherical coordinate values.

1 35). The system of claim 34, wherein the means for performing
2 deparameterization and scalar dequantization further comprises means for
3 mapping spherical coordinate values into decoded, dequantized,
4 unnormalized normal vectors.

1 36). The system of claim 35, further comprising means for decoding
2 compressed three-dimensional graphics model geometric data using entropy
3 decoding, wherein the compressed three-dimensional graphics model
4 geometric data contains error values.

1 37). The system of claim 36, wherein the means for generating actual
2 quantized spherical coordinate values further comprises:
3 means for adding error values to predicted quantized spherical coordinate
4 values to generate the actual quantized spherical coordinate values.

1 38). The system of claim 37, wherein the compressed three-dimensional
2 graphics model geometric data is MPEG4 3DMC.
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1 39). A computer-readable medium having stored thereon a plurality of
2 instructions, said plurality of instructions when executed by a computer,
3 cause said computer to perform:
4 generating actual quantized spherical coordinate values by adding error
5 values to predicted quantized spherical coordinate values;
6 performing deparameterization and scalar dequantization on the actual
7 quantized spherical coordinate values; and
8 generating three-dimensional graphics model geometric data from the
9 dequantized spherical coordinate values.

1 40). The computer-readable medium of claim 39 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer for performing deparameterization and scalar dequantization,
4 cause said computer to further perform mapping spherical coordinate values
5 into decoded, dequantized, unnormalized normal vectors.

1 41). The computer-readable medium of claim 40 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer, cause said computer to further perform decoding compressed
4 three-dimensional graphics model geometric data using entropy decoding,
5 wherein the compressed three-dimensional graphics model geometric data
6 contains error values.

1 42). The computer-readable medium of claim 41 having stored thereon
2 additional instructions, said additional instructions when executed by a
3 computer for generating actual spherical coordinate values, cause said
4 computer to further add error values to predicted quantized spherical
5 coordinate values to generate the actual quantized spherical coordinate
6 values.

1 43). The computer-readable medium of claim 42, wherein the compressed
2 three-dimensional graphics model geometric data is MPEG4 3DMC.

1 44). A system, comprising:
2 a parameterized normal decoder comprising,
3 a processor, wherein the processor performs deparameterization and
4 scalar dequantization on compressed three-dimensional graphics model
5 geometric data; and
6 a storage device connected to the processor for storing instructions
7 executed by the processor;
8 a predictor connected to the parameterized normal decoder; and
9 an entropy decoder connected to the predictor.

1 45). The system of claim 44, wherein the compressed three-dimensional
2 graphics model geometric data includes error values.

1 46). The system of claim 45, wherein the processor maps actual spherical
2 coordinate values into reconstructed unnormalized, dequantized normal
3 vectors.

1 47). The system of claim 46, wherein the predictor generates predicted
2 quantized spherical coordinate values from at least one actual previously
3 quantized spherical coordinate value.

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1 48). The system of claim 47, wherein the processor generates actual
2 quantized spherical coordinate values by adding error values to the predicted
3 quantized spherical coordinate values.

1 49). The system of claim 48, wherein the entropy decoder decodes the error
2 values using entropy decoding.

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